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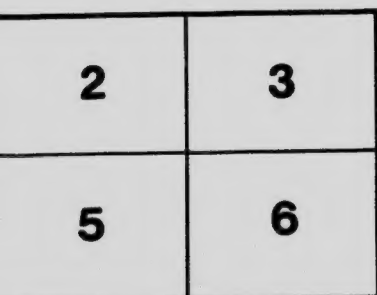
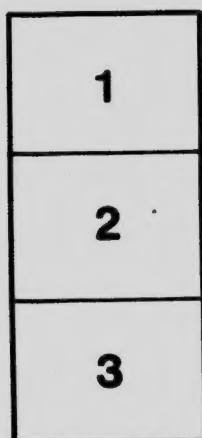
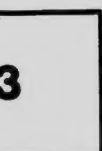
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Ontario Department of Agriculture

ONTARIO VETERINARY COLLEGE

Contagious Abortion in Cattle

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This bulletin on Contagious Abortion in Cattle has been prepared to meet a popular demand and to furnish such information regarding this disease as may seem justified. It is hoped that it may prove useful to veterinary surgeons as well as to owners of breeding cattle. In its preparation the use of technical terms has been avoided where possible. Articles on abortion by various authorities have been freely consulted and drawn upon, of which due acknowledgement is hereby made. Among the writings referred to are those of McFadyean and Stockman, of Great Britain; Williams, Mohler, Eichhorn, Schroeder, Cotton and Giltner, of the United States.

NATURE AND CAUSE OF THE DISEASE.

The condition known as abortion, or "sinking the calf," is one which is often encountered among pregnant cattle. Its occurrence is increasing, and is becoming more acutely felt by many breeders, by noticeably lessening the productiveness of their herds. It has commonly been ascribed to result from a variety of causes, such as errors in feeding and watering, accidents and injuries of all kinds, influences of the weather, and also to supposed defects in the male parent.

While abortion, no doubt, may result in some cases from such causes, nevertheless they account for only a very small percentage of the cases in cattle, the larger percentage resulting from a COMMUNICABLE DISEASE, which is termed CONTAGIOUS ABORTION.

This disease may be described as a contagious affection of cattle, which is manifested by the premature expulsion of the fetus, or untimely delivery of the calf, owing to an infectious catarrh, or inflammation, set up in the womb. The cause of this has been shown to be a germ known as the *Bacillus abortus*, or Tang's Bacillus of Cattle Abortion.

METHODS OF CONTRACTING THE DISEASE.

The disease is generally first introduced into a healthy herd through obtaining breeding cattle from a diseased herd, thus constituting a carrier medium of infection from one herd to another. The manner in which cattle contract the disease or infect each other has been a matter of some dispute. Somewhat extensive investigations have been conducted in Great Britain and America, and the conclusions would seem to warrant the recognition of two channels, by either of which the disease germs may enter the system and reach the womb. One means of entrance is by the mouth with infected feed, water, and milk, and the other by the genital passage.

With regard to infection entering the system by the mouth, some investigators consider that it is probably one of the most common means by which cattle contract the disease. The explanation of this is that an infective discharge containing great numbers of the bacilli, or disease germs, is frequently expelled from the womb of affected cattle. The infective discharges, on being expelled, are very liable to contaminate the bedding and fodder, such as hay and straw, pasture and water, which, in turn, are taken into the mouth and consumed by other pregnant cattle. The germs of the disease, being thus taken into the mouth with the feed and water, are swallowed, and pass into the bowels, from which they are absorbed and are carried by the blood throughout the system until they reach and finally locate themselves in the wall of the pregnant womb, which is their favourable place of abode. It is also claimed that the germs, in some cases, locate themselves in the udder and lymph glands, where they remain stationary for a variable period, and are given off in the milk from time to time. It is also claimed that infection of the surface of the udder and teats occurs by contamination with discharges passing down from the vulva. The surface of the udder and teats, thus contaminated, permits infection of the milk, either while the calf is sucking, or by the hands while milking. By this means it is thought that calves sometimes contract the disease from the milk and grow up infected.

With regard to infection taking place by means of the genital passage, this was formerly thought to be the only method of entrance. It was believed that the discharges from aborting cows, dropping in the stable gutters and against the stalls, infected others by direct contamination of the genitals, or by being switched by the tails of infected cows against the genitals of other pregnant cows occupying adjacent stalls. It was also contended that the infection was chiefly conveyed from female to female through the medium of the bull during service.

Due regard and consideration must always be given to each of these factors as likely means of conveying infection; also that infection frequently takes place by the mouth, through ingesting food, water, and milk, contaminated with infected discharges from aborting cattle.

Irrespective of the manner by means of which the germs may have entered the body, upon their reaching the womb of pregnant cattle they begin to operate harmfully by giving rise to a catarrhal condition, or inflammation, of its surface, and also of the contacting fetal membrane, causing a gradual separation of the placenta, which forms the nutritive medium of connection between the mother and the fetus. The disturbance of this nutritive connection usually results in causing the death of the fetus and its premature expulsion, which is termed Abortion.

SYMPTOMS AND COURSE OF THE DISEASE.

Abortion may take place without any special indications of its approach, and the animal may appear quite well up to the time when the fetus is being expelled.

The actual abortion may entirely escape notice if it occurs during the early stages of pregnancy, as the small fetus or embryo and the membranes are easily expelled, and the owner's suspicions are only aroused when he finds certain of the cows or heifers, considered safely in calf, to be again in season. Even when the fetus is fairly well developed during the advanced stages of pregnancy, it may be expelled without notice, and the accident is first discovered by the presence of the aborted calf and the membranes behind the cow.

In other cases, indications of its probable approach are manifested by the animal. She is noticed to be restless and uneasy and to keep whisking the tail. The udder may become enlarged and full, denoting the appearance commonly termed "making a bag." The vulva appears swollen, and coming from it may be noticed a brownish-coloured sticky discharge. There may also be present the usual manifestations of impending expulsion of the fetus, such as straining. It has also been noticed, in a large number of cases of cattle abortion, that after expulsion of the calf, the after-birth is retained, or, as commonly expressed, the cow fails to clean. Even where the after-birth is not retained, a brownish discharge may continue to come from the genital passage for several weeks. So frequently does retention of the after-birth and this discharge occur in contagious abortion that they are considered as being significant of the disease in a herd even when the calves are carried the full time. The course of the disease is, as a rule, slow, and the period at which the abortion takes place is variable. The majority of cases seem to be noticed between the fifth and seventh months of pregnancy. The usual experience in outbreaks of contagious abortion is that during the first two or three years of its appearance in a herd it claims many victims, and then becomes reduced to a smaller number of cases occurring each year, unless many new females are introduced or young heifers are growing up, which in turn become attacked. Amongst infected cows a large percentage abort twice in succession, and a certain number three times, after which they appear to acquire a degree of immunity or resistance to the disease, which enables them to reach the normal period of calving. This feature has apparently led some to volunteer the statement that the disease will disappear of its own accord, or run itself out of a herd, in the course of three or four years, provided no freshly-infected cows are introduced. This contention is, however, not altogether tenable, because, even when no freshly-infected cows are introduced, the tendency is for the disease to prevail and attack the young females in the herd, unless special measures are taken to protect them. It has also been observed that in herds where contagious abortion prevails, many of the calves, while born at normal time, arrive weak and puny, and become affected with scours and pneumonia, causing death in many cases. Likewise it has been noticed, where there is infection in a herd, that sterility, or barrenness, prevails among both cows and heifers, so that the number of "shy breeders" increases in the herd. This phase of the disease seriously reduces the productiveness of many herds. The cause of the sterility in these cases is a resulting diseased condition of the womb and ovaries, the latter becoming cystic and with retained *corpus luteum* present, or the so-called brownish bodies, in the ovaries.

MEANS OF DETECTING THE DISEASE.

The importance of being able, if possible, to detect and recognize the disease when it first occurs in a herd is apparent, so that steps may be taken to arrest its progress. In this regard the safest course to pursue is to accept the fact of any cow aborting on premises formerly exempt as a sufficient reason for suspecting that the disease has been introduced, and particularly where new females have entered the herd. Additional cases of "calf sinking" occurring at intervals in the herd should be considered confirmatory of contagious abortion being the cause. Experiments have been made with the view of devising some satisfactory method of test capable of determining the presence of latent infection in female cattle, pregnant

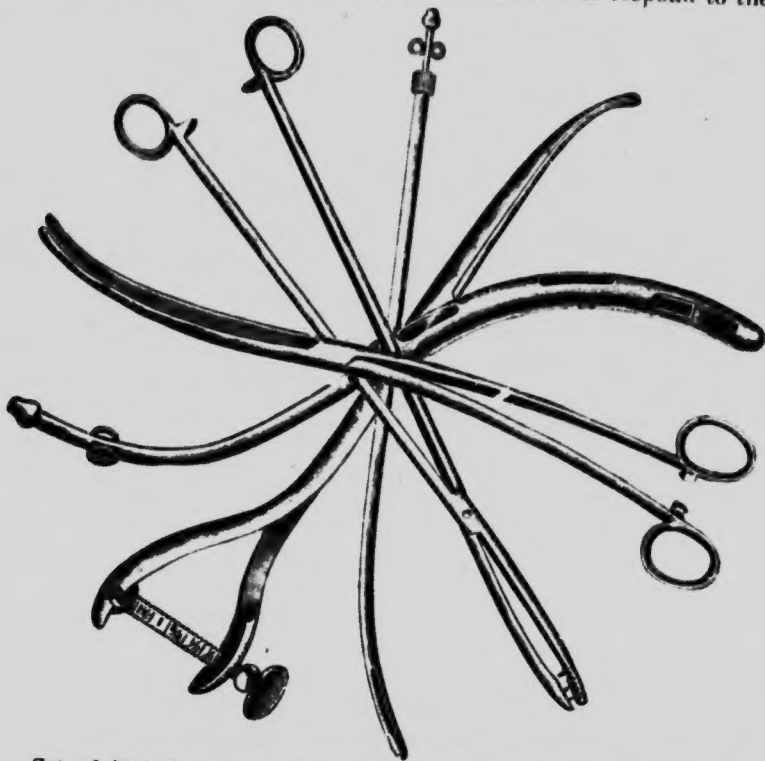
or otherwise. Among the methods used for this purpose may be mentioned the abortin test, the agglutination and complement fixation tests.

THE ABORTIN TEST.

This test is known also as the reaction method and consists of the injection, under or in the skin of suspected females, with a substance called abortin, which is an extract prepared from artificially grown cultures of the bacillus of cattle abortion. It is used in a manner somewhat similar to that in the application of the subcutaneous and intradermal tuberculin tests. The Subcutaneous Abortin test is manifested and interpreted by a rise in temperature exceeding 104 deg. Fahr., which begins about the fourth hour after injection and lasts usually until about the fourteenth hour.

The Intradermal Abortion test has been advocated as a better method. The reaction by this method is manifested by a swelling of the skin at the point of injection, which is made at the root of the tail.

Attempts have been made to extol commercially the use of these tests. Their reliability, however, is doubted, as the results have not proved uniformly satisfactory. It would appear that while a rise of temperature or a local swelling after injection of abortin may be indicative of infection, on the other hand the absence of this reaction is not considered a safe criterion as to the freedom from infection. This is owing to the fact that many infected animals fail to respond to the test.



Set of instruments used in the operative treatment of irrigating the womb of cows to overcome sterility following abortion. The above set includes the Albrechtsen uterine dilator and return flow catheters and a pair of the Knowles uterine forceps.

THE AGGLUTINATION AND COMPLEMENT-FIXATION TESTS.

These are serologic or blood tests of a somewhat delicate and complicated nature. They can only be properly performed in a suitable laboratory by a skilled person. For making these tests, samples of blood are taken, with proper precautions, from suspected cattle and sent to a laboratory for examination. The results are based upon the specific action which cultures of the abortion bacillus have upon the blood serum of the animal. These tests, when properly performed, appear to be the most trustworthy as yet for the detection of latent infection in cattle, both before and after the act of abortion.

METHODS OF PREVENTION AND TREATMENT.

Up to the present, the essential basis of dealing with contagious abortion in cattle is by sanitary measures. This consists in adopting measures to protect a sound herd from becoming infected and to control the disease in an infected herd. Important requisites towards this end consist in preventing infected cows from mingling with healthy ones, and the separation of any suspected aborting cattle from other pregnant cows and heifers. In adding breeding cattle to a herd, careful enquiries should be made to ascertain if the herd from which they are being obtained is free from abortion disease. If doubt exists as to their freedom from this disease, the newly obtained pregnant females should be kept separate until they calve.

All cases of abortion should be regarded, irrespective of excusable circumstances, as at least probably the contagious form and precautions taken accordingly. As soon, therefore, as any animal in the stable shows signs of aborting, or has aborted, it should at once be removed to a separate stable. The feed should be removed from the mangers and all bedding and litter from the stalls burned, as well also as the aborted fetus and the after-birth. The stable walls and stalls, including the floor and gutters, should be thoroughly cleaned and disinfected with lime wash.

The aborting cow is very liable to retain the after-birth, and should have the membranes carefully removed if not expelled within two or three days. During this time the womb should be washed out once every day with a lukewarm antiseptic solution, such as a one per cent. solution of lysol, or with a one-in-one-thousand solution of potassium permanganate. After expulsion or removal of the after-birth the womb should be flushed out with about two gallons of a one per cent. Lugol's solution of iodine, followed by a saline solution made by adding two ounces each of fine dairy salt and bicarbonate of soda to a pail of clean lukewarm water.

The flushing may be repeated once a week for a month by the use of the Albrechtsen uterine return flow catheter. This method of treatment is recommended for the prevention of sterility in breeding females, particularly valuable pure-breds.

In many cases the frequency of washing of the womb may be reduced by the use of antiseptic powders in capsules. For this purpose a gelatin capsule containing an ounce, composed of equal parts of iodoform and boracic acid, may be introduced into the womb a few hours after calving, and then repeated the following day. This practice has been found useful, particularly in cases where the after-birth is retained.

The aborting cows, and all the exposed pregnant ones, particularly those occupying stalls adjacent to the aborting animal, should have their hind parts, including

the tail, hips, and udder, washed thoroughly with an antiseptic solution such as a two per cent. solution of lysol or creolin.

Cattle, after aborting, should preferably be kept by themselves for a period of at least one month, and they should not during this period of time be pastured in the same fields as healthy pregnant cattle, nor allowed in the pasture fields so long as discharges continue to come from the vulva. This is important, because the discharges may infect the grass and water, and which, when thus contaminated, may remain virulent and a possible source of infection for some time. At the end of the isolation period, before allowing aborting cattle to mingle with the other members of the herd, it is advisable again to thoroughly wash off their hind parts and disinfect the stable in which they have been kept. Cows which have aborted should not be bred again until a period of one or two months has elapsed, and not even then if they show any signs of discharges coming from the genitals.

The bull, each time after serving aborting cows, and before serving healthy cows, should have the end and inside of the sheath washed with a mild antiseptic solution, such as a one per cent. solution of lysol or a three per cent. borax solution. In treating the inside of the sheath the antiseptic solution can be injected with an ordinary metal or rubber syringe.

THE USE OF DRUGS.

The internal use of drugs alone appears to be of little real benefit in abortion disease of cattle. From time to time certain agents have been used and were highly praised for a time as a likely cure.

The carbolic acid treatment, which was particularly popular for a time, consisted in administering it daily, in dram doses, or at intervals of several days throughout pregnancy.

Another drug, known as methylene blue, has been advocated as a likely cure. It is given in doses of one or two teaspoonfuls daily in the feed for a period of five or six weeks.

While no serious objection to the use of carbolic acid and methylene blue need be taken, nevertheless their curative value has been over-stated. In fact, the use of these remedies in the hands of those most capable of judging as to their merits has shown them to be of no lasting benefit, and their popularity has greatly diminished.

VACCINE TREATMENT.

More recently the treatment of cows and heifers for abortion is being undertaken by means of special abortion bacterins and vaccines to confer immunity or protection against the infection. The bacterins are composed of killed abortion bacilli in suspension, and are advocated for the treatment of doubtful cases and for infected cows during the first half of the term of pregnancy. The bacterin treatment has unfortunately not as yet proved altogether as satisfactory or successful in conferring immunity or protection as expected. The abortion vaccines are products containing living cultures of the bacilli, and on that account are only recommended for use in herds already infected, and to be administered to heifers and non-pregnant cows from one to two months before breeding. It is not advisable

to use the vaccine on pregnant animals nor in herds in which the disease is not present.

The preparation and use of abortion vaccines are as yet largely in the experimental stage, and the evidence at hand so far is only sufficient to recommend their use in affected herds on heifers and non-pregnant cows before breeding as a means of assisting materially in obtaining living calves at full term.

HOW TO OBTAIN VACCINE.

The Health of Animals Branch of the Department of Agriculture at Ottawa will supply qualified veterinary surgeons, with contagious abortion vaccine, free of charge, providing an owner of cattle makes a request that he desires to have his animals vaccinated, and furnishes the name and address of the veterinarian he desires to employ and the number of animals to be treated. On receiving such a request the vaccine will be sent to the veterinary surgeon, with directions as to its use.

Owners desiring to avail themselves of this arrangement may do so by writing to the Veterinary Director General at Ottawa.

Abortion vaccines are also sold by commercial concerns, and may be obtained through reputable veterinary surgeons and used under their direction.

TREATMENT OF WHITE SCOURS.

Where abortion disease exists in a herd, outbreaks of White Scours may occur among the calves, causing severe losses at times. In these cases the healthy calves should be immediately removed from among the sick or dying calves. The soiled bedding should be frequently removed from the calf pens and replaced with clean bedding. The stalls should be well disinfected from time to time. If veterinary assistance is available it should be obtained for the administration of special remedies such as the serum and bacterin treatment. After the affected calves are a few days old they may be fed on boiled milk to which may be added half a teaspoonful of lysol or formalin morning and evening until relief is afforded.

STERILITY.

In herds where sterility or barrenness prevails to an increasing extent among the females it should be considered as a resulting phase of abortion disease. Where the barren females are only of ordinary beef value, they may be disposed of for slaughter. In the case of valuable cows being affected, the services of a skilled veterinarian should be obtained for the purpose of treating the womb by the Albrechtsen method, and to manipulate the ovaries with the hand to rupture cysts, if present, and to expel retained *corpus luteum*, or the so-called brownish body. This operative treatment of the womb and ovaries by a skilled person results in restoring many valuable cows to breeding usefulness.

SUMMARY OF LEADING POINTS.

1. In purchasing pregnant cattle, make careful enquiries in order to ascertain if the herd from which they are being obtained is free from abortive disease.
 2. If doubt exists as to their freedom from this disease, keep the newly obtained females separate until they calve.
 3. As soon as a cow aborts remove her to a separate stable.
 4. Thoroughly clean and whitewash the stalls in the stable. The bedding and litter removed from the stalls should be burned, together with the aborted fetus and the after-birth.
 5. Wash off the hind parts of all the exposed pregnant cows with an antiseptic solution.
 6. Cleanse the genital passage of the aborting animal with mild, warm antiseptics. This should be repeated daily until the neck of the womb closes. If the washing of the womb is not desirable, make use of antiseptic powders in capsules.
 7. Do not allow cows with retained after-births to remain in stalls adjacent to other pregnant cows.
 8. Keep aborting cows separate from the others so long as they are discharging. Wash their hind parts before allowing them to return to the herd.
 9. Allow a period of at least one or two months to elapse before returning aborting cows to the bull.
 10. Wash the end and inside of the bull's sheath after service of doubtful cows and before service of healthy cows.
 11. Do not allow the bull to serve aborting cows which have a discharge from the vulva.
 12. Obtain the advice and guidance of a qualified veterinary surgeon as to the use of vaccines or bacterins, combined with the sanitary measures recommended.
 13. If calves become affected with White Scours, immediately separate the sick ones from the healthy. Consult a reputable veterinary surgeon for special treatment and as to the use of special serums and bacterins in conjunction with sanitary measures.
 14. In the case of valuable cows becoming barren, the services of a skilled veterinarian should be obtained for the purpose of treating the womb and ovaries.
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